Industrial relations in the Australian engineering industry, 1920-1945: the Amalgamated Engineering Union and craft unionism

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Chapter Two

Production Methods and Work Practices

This chapter examines production methods and work practices. The purpose of the examination is to measure the extent of deskilling, inflicted by technological developments, on tradesmen's craft. Although mechanisation and job specialisation were always proceeding, it did not necessarily lead to the displacement of skilled workers, as noted in the Introduction. Therefore, a careful examination is needed to show the extent to which technological developments lessened the dependence on the traditional skills thereby eroding the basis of the craft union's industrial power.

In this discussion, two kinds of deskilling need to be distinguished. One is 'technical deskilling', which designates the simplification and routinisation of an actual operation by means of mechanisation and job specialisation. The second is 'classificatory deskilling', which designates the assignment of non-skilled workers to operations hitherto performed by the skilled. While the former deskilling is purely technical, the latter concerns the deployment of the employees.

It should be borne in mind that these two kinds of deskilling do not necessarily happen concurrently. For instance, even if the skill required for an operation is diluted technically, whether or not the management is able to put the non-skilled on the job is another problem. This depends ultimately on the balance of industrial power between the management and the employees. On the other hand, 'classificatory deskilling' is possible without 'technical deskilling'. If the management can put the non-skilled on the easier parts of tradesmen's work, it will reduce the labour cost, at the same time driving a wedge into the craft community.
Since the basis of a craft union's industrial power resides in the management's dependence on tradesmen's skill in the running of production, it is crucial for a craft union to defend the craft from both 'technical' and 'classificatory' deskilling. From the employers' point of view, it is not enough to dilute the skill only in the technical sense in order to dispense with tradesmen. Considering the strong opposition from a craft union to any attempts to challenge its prerogatives, the technical deskilling required for the replacement of tradesmen has to be thorough to the extent that the dependence on their skill in production is minimised. In other words, the employers are not necessarily able to fully enjoy the benefits of mechanisation, unless the dilution of skill is complete. If the technical deskilling proceeds only piecemeal and production remains labour intensive, the erosion of the craft union's power is relatively limited.

In the course of the 1920s, the engineering industry in Australia had made a sizeable development before it was hit by the Great Depression at the end of the decade. Before looking into actual work practices, this chapter briefly surveys the development of the industry using statistical information. Because the execution of engineering operations and the employment of engineers were not confined to engineering shops classified as such, the development of the engineering industry is measured, in this study, by the performance of the whole metal industries including such manufacturing industries as the shipbuilding, motor-body building and armament industries.

Table 2.1 shows the performance of the Australian metal industries during 1920s in terms of the number of factories and employees and the value of output in both current and constant prices. The number of metal factories increased continuously --about 1.4 times-- throughout the 1920s. The number of employees continued to rise after the 1921 recession until 1927 when it reached its pre-Depression zenith of about 133,000. During this continual development between 1921 and 1927, the number of employees increased about 1.3 times. Then it levelled off and, finally collapsed at the end of the decade.
Reflecting the development of various elements shown above, the value of output of the Australian metal industries also made a conspicuous increase. In current prices, the value of output grew rapidly and continuously after the 1921 recession, growing about 1.5 times between 1922 and 1927. In constant prices, the output continued to grow from the beginning of the decade until 1927, expanding around 1.7 times. As an overall trend, the output can be regarded as having developed throughout the decade until the Great Depression in 1929 in both nominal and real terms, although it levelled off after 1926.

In short, after the 1921 recession, the Australian metal industries made a steady development during the 1920s until they were hit by the Great Depression at the end of the decade, although the upward trend was curbed around 1927.

It should be recognised that, the Great Depression aside, the decade as a whole was a period of a substantial development for the Australian metal industries. However, whether this development was facilitated by radical changes in production methods and work practices, which dispensed with traditional craft, is another question which needs to be addressed.

Table 2.1 (I)Number of Metal Factories in Australia, (II)Average Number of Employees in Metal Factories(x1000), (III)Nominal Value of Output of Metal Factories(x1000 pounds) and (IV)Real Value of Output of Metal Factories(1920-21=100)*, 1920-1930

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<td>5256</td>
<td>125.2</td>
<td>96751</td>
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Source: Official Year Book of the Commonwealth of Australia.

Note: Figures in the categories of 'Metal Works, Machinery, etc.', 'Arms and Explosives', 'Vehicles and Fittings, Saddlery and Harness, etc.' and 'Ship and Boat Building and Repairing' are combined.


As shown in the previous chapter, the prescription of margins for machinists was among the most important issues contained in the Court. In the first Federal engineering case at the beginning of the decade, the AEU claimed, successfully, the same margin as tradesmen for the operators of basic machines like the milling, shaping, slotting and planing machines as 'first class machinists', despite the tenacious opposition by the employers. To understand the real significance of the debate, however, a closer examination is needed beyond award provisions to the deeper issues of mechanisation and the division of labour.

The following evidence is worth quoting at length to trace the development of mechanisation. Answering a question by Justice Higgins, an employer depicted the ramification of the traditional trade as follows:

Q: When the millwright was split up into fitter and turner, the fitter and turner got the same as the millwright...When the fitter split up into a planer and slotter you would not give the same wage to a planer and slotter?
A: No...the slotter and the shaper and planer were tools that were put into the trade to assist the fitter...[T]he milling machine is an evolution of the slotter and the gear cutter is an evolution of the slotter and the gear generator...Then the broaching machine was an evolution of the slotter. The shaper has evolved the planer and so on...[E]ach one has been divided into two distinct groups, one group to assist the fitter and the other group to assist the turner. The whole series of machines that are made are either on the fitter's side or on the turner's side.¹

¹ Evidence of W. Hipsley, Transcripts of the Case heard before the Commonwealth Court of Conciliation and Arbitration (Transcript), No. 113 of 1920, The Amalgamated Society of Engineers versus the Adelaide Steamship Company Limited and Others, 4/3/1921, p. 2217.
From the employers' point of view, machinists were not independent tradesmen but assistants of fitters and turners. They insisted that the case with machinists was different from that of fitters and turners who had sprung from and eventually taken over millwrights' work, without their status as tradesmen being lowered: 'The fitter takes the place of the captain of the ship and the machinist is the assistant to the captain, or assistant to the fitter'.

There was vertical division of labour between machining work and fitting and turning work, and in this division the employers regarded machinists as assistants of tradesman fitters and turners:

The work that the machinist does is incomplete; when the machinist is finished with it the turner or the fitter takes the work and completes it.\(^2\)

[\(I\)n every case practically the work of the skilled tradesmen commences when the machine has finished.\(^4\)

At this stage of technological development, machine work alone could not turn out finished articles without the final elaboration by skilled tradesmen. Machining only made a preparation for real tradesmen's job. Therefore, the employers regarded machinists as assistants of tradesmen.

It should be borne in mind that the accuracy attainable by machines in those days was insufficient to dispense with the finishing touch of tradesmen. In this vein, it is an interesting fact that the employers voluntarily acceded to paying the tradesmen's margin for the machinists on the universal milling and boring machines, despite their demand for lower rates for other machinists. Their willingness to pay the same skilled rate derived from their recognition that the operation of universal milling and boring machines came much closer than that of other machines to tradesmen's work in accuracy and intricacy:

\(^2\) Ibid., 23/3/1921, p. 2959.
\(^3\) Ibid., 10/3/1921, p. 2568.
\(^4\) Ibid., 23/3/1921, p. 2981.
Where the turner has to calculate his wheels to obtain the counter thread, the man on a universal milling machine has to calculate his wheels to give him a certain number of threads per inch...[C]alculations are similar in both instances. He must also fix the work when the turner partially finished it...[T]hen it goes back again to the turner to be finally finished, and so in that way the turner and the miller have to work more or less together. With the other machines, when the machinist has finished his part goes to the fitter, and it is not returned again to the machinist for any further fitting on it.5

Thus, although machining operations had already taken over a large part of tradesmen's job, the distinction between machine work and what was regarded as tradesmen's work still remained clear. The following remark by an employer conveys the derogatory connotation of the word, 'machining', in comparison with genuine tradesmen's work like 'fitting and turning':

No father I would think would put his boy to learn such a low grade calling as just machining. He should learn the whole trade of fitting and turning.6

For its part, the Union insisted that apprentices should be taught properly the whole range of the trade, although in practice it was not the case in Australia at that time that apprentices were trained solely for machining.7 It was already a common practice, however, that apprentices spent a large amount of time on machining in their training. At Mort's Dock, for example, three out of five years of an apprenticeship for fitters were spent on the machine training starting from drilling:

We first start them [i.e. apprentices] on a drilling machine...They have a course of about 3 years in the machine shop. They go from the driller to the shaping machine...Then they go from the shaper to the slotter, from the slotter to the planer, and then to the fitting shop...They go to the inside fitting shop and during the last period of their time we send

5 Ibid., 23/3/1921, p. 2985.
6 Evidence of H. Mitchell, ibid., 19/11/1920, p. 797.
them out amongst the ships. (Q: But there is no apprentice indentured to machine work only?) No.8

Generally speaking, the training stages were arranged in order of difficulty. It should be noted that tradesmen themselves held the drilling operation in very low esteem. In fact, the operators of the drilling machines, like those of the screwing machines, were the only exception among machinists, for whom the Union did not claim the same rate as tradesmen. A Union witness in the Court replied to the Judge's question as follows:

Q: Would a skilled turner operate an automatic screwing machine, known as an automatic lathe?
A: He would consider it infra dig to a certain extent.9

It should be emphasised that both the employers and the Union recognised the hierarchical order of machines. The employers were ready to pay the full tradesmen's rate to those who operated such intricate machines as the universal milling machines, while the Union excluded simple machine operations like drilling from the ranks of skilled work.

For all the heated debate over the margins for machinists, the actual number of 'machinists' classified as such was limited. Judging from the evidence of the Arbitration Court and the examination of the available wages books, except for drillers, only a few 'machinists' were employed as such at engineering shops.10 In addition, most of these few 'machinists' were not trained in Australia but were migrants from Britain, where a more advanced economy and the spread of the improver (i.e. unindentured apprentice) system had produced a large number of machine specialists:

9 Evidence of A. Everden, ibid., 15/12/1920, p. 1500.
10 See Ibid., 14/12/1920, p. 1439. See also Table 5.5 at p. 203. Wages books of Mitchell & Co. (a Victorian agricultural implement manufacturer) and the Commonwealth Sugar Refinery are available at the N. G. Butlin Archives.
Most of the witnesses [i.e. machinists] were unapprenticed...[T]here was simply a verbal undertaking...[They are] what they call here an improver...[T]he improvers go into the shop and they are employed as boys and work their way up among the machine tools. (Higgins: I think you have not got that man in NSW.) We have not got that, but it was very noticeable that most of the witnesses[i.e. machinists] came from overseas, and secondly that none of them were indentured in any way at all. That is quite the usual practice in the north of England for there to be no apprenticeship.\textsuperscript{1}

In general, the AEU succeeded in preventing the introduction of improvers in Australia and 'machinists' did not constitute an industrial group of any numerical importance.

It is rather peculiar that while the machine work was occupying an increasing portion of engineering work, the number of 'machinists' classified as such remained negligible. This was only possible because most of the machine work was done by those not classified as 'machinists'. Of course, tradesmen did the machine work as part of their job. It was apprentices to whom most of the machine work was assigned. In this regard, an employer answered the Judge's question as follows:

Q: You pay slotters, planers, and shapers the same rate as fitters and turners?
A: We have got none of those men on that work as invariably the work is done by the lads coming along from apprenticeship...They come along through that source on the machine in their training as turners and fitters.\textsuperscript{12}

For the employers, apprentices were cheap skilled labour at hand. In his reply to the Judge, an employer openly admitted the merit of using apprentices:

Q: Mr. Heine [i.e. an employer] said it makes the work cheaper to have apprentices. Do you agree with that?
A: I agree with that.
Q: Even if they have not acquired a full training?
A: You select different work for the apprentice. The apprentice is a unit of the whole industry and in all works there are some

\textsuperscript{11} Evidence of W. Hipsley, \textit{ibid.}, 22/3/1921, p. 2285.
\textsuperscript{12} Evidence of A. McDonald, \textit{ibid.}, 24/2/1921, p. 1747.
portions which are simpler than others, and the apprentice would receive the simple portions.\(^{13}\)

The machine work was performed mainly by apprentices and, therefore, the number of 'machinists' was only limited. Then, the question has to be asked why the debate over machinists' margins was so important. It should be borne in mind in this regard that this argument was made in the prospect, shared by both the employers and the Union, that mechanisation and division of labour would be accelerated over time, multiplying both machine operations and operators.

In this prospect, the employers made clear their intention of attacking the traditional apprentices-tradesmen system. They demanded that machinists should be ranked beneath tradesmen and, therefore, be recruited outside the apprenticeship system:

The farmer, the agricultural laborer, has got to use files, hammers and screwdrivers in the adjustment of his machinery, and yet the fitters want to say that they being fitters' tools only fitters should do it. The engineer turner says that every tool that is produced, if it is going to cut metal, belongs to either the fitter or the turner. I say that the time has gone by for that sort of thing, that the turners' and fitters' position still remains. He is still at the top of the trade, but there is another class of labour, the assistant to the turner and fitter that has come into the field in the last 10 or 15 years and is essential in the production of quantity stuff produced by men that are not apprenticed and have never been apprenticed, and do not required to be apprenticed...I say unless this Court makes some provision for labor other than apprentices and journeymen to operate those machines for the production of parts, then it is utterly impossible for Australia to produce those commodities for herself.\(^{14}\)

This demand by the employers ran directly counter to the major principle of craft unionism that tools of the trade, including machines, should be handled solely and exclusively by tradesmen. With the development of mechanisation, the employers were stepping up their attack on craft regulation.

The employers were also seeking to dissolve craft unity by dividing tradesmen's work into specified processes and putting the non-skilled on simpler operations for which lower rates were prescribed than those for tradesmen. At the same time, the employers claimed that, even a tradesman should be paid less than the full skilled rate when engaged in simple machine work:

> [E]very man should be paid according to the work which he is called upon to do...[I]f a fitter or turner chooses to take a machine operator's job, then he should be paid according to the value of the job which he is called upon to do and not for some latent ability or skill in him which is not required by the master.15

This request was also a radical challenge to craft unionism, because in the traditional principle of wage setting, the rate was prescribed according to the worker's qualification and not to the operation he performed. Therefore, a tradesman was paid the tradesmen's rate whatever work he did. As long as the employee was assigned on a wide range of heterogeneous work, the wage could not be determined other than according to his qualification because the management could not specify his task. As mechanisation and specialisation advanced, however, some operations were standardised and it became possible for the management to set routine operations. At the time under consideration, the technical ground was being established that would enable the employers to classify such operations as less-skilled and prescribe lower rates, although of course the actual practicability of such strategy was contingent on the balance of industrial power between the management and the workers.

As demonstrated, behind the arguments over the margins for machinists lay the employers' intention of systematic attack on craft unionism. In reality, however, the employers had a limited number of strategies in the absence of drastic technological changes. Under the circumstances, 'classificatory deskilling', rather than 'technical deskilling', was the major strategy adoptable, even

though, if successful, it would only bring about piecemeal erosion of the craft fortress.

The Union took the employers' challenge seriously. Although there was no imminent threat of the replacement of tradesmen, the Union thought that any alteration of the traditional industrial principles would lead, in the long run, to the disintegration of the craft community.

As shown in the previous chapter, Justice Higgins generally supported the Union's arguments in his judgements. The operators of the milling, planing, shaping and slotting machines were, as the 'first class machinists', evaluated as equal to tradesmen and prescribed the same margin. In so doing, Higgins made clear his intention to protect legitimate tradesmen from the threat of 'machinists', who were regarded as imperfect tradesmen. He tried to maintain the traditional apprentices-tradesmen system and prevent the use of those who did not fall within this system. Thus, he frustrated the employers' intention to introduce cheap machinists as the 'semi-skilled' from outside an apprenticeship. In addition, he also rejected the employers' plan to undermine craft unity by changing the principle of the wage-setting.

It should be noted that Higgins' judgement was not only a reflection of his moral belief but was founded on technological and economic grounds. Apart from the drilling operation which even the Union excluded from the ranks of skilled operations, machine work was not necessarily a simple job. The AEU representative in the Court remarked:

In working these machines the greatest difficulty is not merely looking after the tools but in setting the job accurately, setting in such a way that it will be accurate when it is finished, and making it of the necessary size and shape; because a machinist's work has to be worked to sizes and to shapes which a fitter has to work, and the same to as a turner. Then we must not overlook the fact that in a good many cases it is customary to apprentice youths to machine work.16

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16 Evidence of E. Barker, ibid., 19/4/1921, p. 3774.
The essential part of machinists' work consisted in the setting-up of machines, which had to be as accurate as possible for the convenience of tradesmen who did the finishing work. Such ability of machinists was highly regarded by the employers as well. In fact, some cases were reported where the employers were willing to pay the full tradesmen's rate for machinists engaged on setting-up and supervising work. An employer stated:

> There is an adult in charge who sets up the work and then the apprentice would be left to take care of them...He is a machinist...a general machinist...This particular man is getting the fitters' rate of pay. (Q: Does he do anything else while these gear cutters are working other than looking after the gear cutting?) He superintends other milling machine operations.  

Although division of labour was established between the setting-up and the operation of machines at this firm, in general it was the common practice at the time that both were performed by the same worker:

> Q: In the majority of shops would the tools be set in a lathe by the man who works the lathe or by somebody else?  
> A: [A]t the present time usually by the men who work the lathe, but there are all degrees and [when] manufacturing things in quantities it will have to be done a different way.  
> Q: Usually lathes and other machines are set by the man who works them?  
> A: That is so.  

As implied in the above comment, the employers were seeking to separate the setting-up and the actual operation of machines, with the intention of prescribing lower wages for the latter class of work. In practice, however, the separation of the two remained undeveloped, proceeding no further than the elementary level where they were roughly divided between tradesmen and apprentices. In any event, Higgins' judgement officially confirmed the setting-up of machines as a skilled operation, which was to help curb the disintegration of the craft community.

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It was because of the limited scale of production that the employers could not further the division of labour and thereby break craft domination. Throughout the 1920s the Australian engineering industry consisted predominantly of 'jobbing', that is, repairing and small-scale making for orders. In 1924, an AEU official estimated that 75 per cent of all engineering shops were engaged in jobbing and repairing.\textsuperscript{19} The employers who ventured into manufacturing were still few, and their business was confined to the production of a small number of varied articles. For instance, one of the leading manufacturers deplored that he had to produce forty to fifty different types of engines.\textsuperscript{20} The following remark by an employer on 'repetition work' referred to the limited scale of production and the limit of mechanisation and division of labour:

There must be 50 articles made for repetition. I think that would be a reasonable basis...\textsuperscript{(Q: In one brass finishing firm it is 18?) 18 articles would not in my opinion be worth setting up the machine for repetition work of the kind I am referring to. Some people use numbers for the sake of doing so but one must look at it logically. It takes time and costs money for the skilled operator to set the machines up and you must therefore put enough through to make it worthwhile.\textsuperscript{21}}

With the scope for the standardisation of production being limited, it was rather more convenient and inexpensive for the management to entrust the whole production process to skilled tradesmen. An employer replied to the Judge's question:

Q: Would you put a man of less skill on that turret lathe than you would put on the engine lathe?
A: It would depend on the number of articles we did...[T]he work changes so frequently we would not put a turret lathe operator on to that lathe [i.e. the turret lathe], we put a turner on to that lathe.\textsuperscript{22}

\textsuperscript{19} Evidence of C. Mundy, \textit{Transcript}, No. 309 of 1923, The Amalgamated Engineering Union versus Adams and Others, 29/7/1924, p. 90.
\textsuperscript{20} Evidence of A. McDonald, \textit{Transcript}, No. 113 of 1920, \textit{op. cit.}, 24/2/1921, p. 1747.
\textsuperscript{21} Evidence of A. Tournayhind, \textit{ibid.}, 8/3/1921, p. 2381.
\textsuperscript{22} Evidence of J. Heine, \textit{ibid.}, 10/3/1921, p. 2520.
Although the turret lathes, once set up, could be easily operated by the non-skilled for repetition work, the frequent changes in setting prevented the employers from taking advantage of such machines.

As mentioned, the Australian engineering industry in the 1920s mostly comprised jobbing and repairing, the development of manufacturing being only gradual. Even so, it should not be ignored that the distinction between repairing and manufacturing was becoming opaque, as repairing involved the making of standardised spare parts. A work's manager at a railways shop described the repetitive nature of repairing work as follows:

As those engines come in periodically for repairs, certain parts have to be made. There may be one part, or anything up to a dozen parts ordered by the stores to meet the requirements of country depots or our own use. The patterns are standardised. You could not by any possible chance call the work done on those jobbing work. It is standardised work, and it approaches very near to repetition work.23

Although this change in the nature of repairing should not be neglected, the development of mechanisation and job specialisation during the 1920s was not thorough enough to dispense with the traditional skill of tradesmen. An AEU member stated that engineering shops in Australia still needed all round tradesmen:

The industrial development in Australia has reached a certain point, but it has not developed as far as the development in Great Britain, so far as specialisation is concerned; there is not that minute subdivision of labour that is experienced in other countries...Everybody knows that a man to be of proper advantage in a plant in Australia has to be a good all round man.24

The industry being based on the production of small amount of various articles, production had to be entrusted to 'good all round men' rather than specialists, in order to keep it flexible. In this


regard, the employers defined the qualifications of a competent tradesman as follows:

I consider a competent fitter or other tradesmen should be capable in a general way of performing the various operations which come within the range of his craft.25
A tradesman is a man who has such training and knowledge that he can be relied upon to work from a drawing and do any of the operations pertaining to the trade reasonably well without constant guidance.26

These requirements of a tradesman indicate how much the management depended on the wide range of abilities of tradesmen for the running of production. Under these circumstances, tradesmen, as a whole, did not lose their industrial ground in the 1920s. In terms of the classificatory framework, engineering tradesmen consolidated their position. As shown, they succeeded in incorporating 'first class machinists' into the ranks of tradesmen. In addition, it also succeeded in establishing the new category, 'toolmakers', for those tradesmen engaged in higher classes of skilled work.

'Toolmakers', who were engaged in the making of dies, gauges and other tools used for repetition work, were regarded as more highly skilled than ordinary tradesmen. 'Toolmakers' were different from ordinary tradesmen in three ways. First, toolmakers were engaged in the design or the lay-out of the article, whereas ordinary tradesmen were only required to work according to given blueprints.27 Second, they performed the whole operation by themselves in making the tool they were responsible for:

If the turner is doing the turning, the miller doing the milling, and the grinder doing the grinding, and the fitter doing the fitting, they are not toolmakers, but where the man does all the operations, then, he is a toolmaker.28

26 Evidence of G. Clerk, ibid., 20/8/1924, p. 842.
28 Ibid., p. 4.
Third, their manual ingenuity was crucially important in making of these tools. It was due to the technological fact that only the deftness of individual workers allowed finer accuracy beyond the limitation of machines to be attained.

[W]e regard as a first class tradesman, a man who is able to work to exact sizes, if necessary—certainly to a thousandth of an inch...[A] die sinker [i.e. toolmaker] is a man who can work to much finer limits than a turner. In cases of hand work, it is possible for a man to work to ten thousandth. The leading screw is made by hand, and no lathe can produce greater accuracy.29

With these special attributes, that is, the capacity to lay out, 'all-roundness' and manual ingenuity, 'toolmakers' still retained traces of the nineteenth century craftsmen.

The employers initially opposed the creation of this new category, arguing that 'toolmaking' was not an independent trade but part of fitters' and turners' operation. The conventional practice was that there was no apprenticeship for toolmaking itself and those tradesmen who had accumulated knowledge and experience were assigned to the intricate work of toolmaking. Therefore, instead of recognising 'toolmaking' as an independent trades, the employers sought, abortively, to give merit increases, in addition to the ordinary tradesmen's rate, to those engaged in more highly skilled work based on the job evaluation by the management.30 The Court declined the Unions' claim that the toolmakers' rate should be paid to all workers in the toolroom. So far as the principles of craft unionism themselves were concerned, the Union succeeded in fending off the employers' offensive.

The engineering industry in the 1920s still remained dependent on the traditional craft of fitters, turners and toolmakers. This conclusion is supported statistically in the following tables.

29 Evidence of T. Witten, ibid., 5/8/1926, pp. 16-17.
Table 2.2 and 2.3 below show the changes in the value of output per capita, the value of materials used per capita and the value of salaries and wages per capita in both current and constant prices, respectively.

Table 2.2  (I)The Value of Output Per Capita, (II)The Value of Materials Used Per Capita and (III)The Value of Salaries and Wages Per Capita of the Australian Metal Industries, 1919-30: Current Prices (pounds)

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<td>403.5</td>
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<td>29-30</td>
<td>732.6</td>
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<td>232.3</td>
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</table>

Source: Official Year Book of the Commonwealth of Australia.

Note: Figures in the categories of 'Metal Works, Machinery, etc.', 'Arms and Explosives', 'Vehicles and Fittings, Saddlery and Harness, etc.' and 'Ship and Boat Building and Repairing' are combined.
Table 2.3 (I)The Value of Output Per Capita, (II)The Value of Materials Used Per Capita and (III)The Value of Salaries and Wages Per Capita of the Australian Metal Industries, 1919-30: Constant Prices(1920-21=100)*

<table>
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<th>III</th>
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</thead>
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<td>1919-20</td>
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<td>29-30</td>
<td>128.3</td>
<td>115.0</td>
<td>135.3</td>
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</tbody>
</table>

Source: Official Year Book of the Commonwealth of Australia.

Note: Figures in the categories of ‘Metal Works, Machinery, etc.’, ‘Arms and Explosives’, ‘Vehicles and Fittings, Saddlery and Harness, etc.’ and ‘Ship and Boat Building and Repairing’ are combined.


The output per capita was in the upward trend between 1920 and 1926 both in the real and nominal terms, increasing about 1.2 and 1.4 times respectively. The increasing rate was especially high between 1923 and 1925. However, the rapid increase halted in 1925, and after 1926, long before the Great Depression, it was in the downward trend. As shown at the beginning of this chapter, the value of the output of the Australian metal industries, as a general trend, grew until the 1929 Depression. It can be assumed, therefore, the increase in the value of the output after 1925 was achieved on account of the increased employment without an improvement in output per capita.

Corresponding to the increase in the output per capita, the value of plant and machinery in factories per capita also increased between 1920 and 1926, rising about 1.2 times in current prices and 1.4
times in constant prices. As a trend, it rather stagnated after 1925 and jumped up at the end of the decade because of the sudden reduction in employment.

The real value of raw materials used per capita also rose rapidly between 1920 and 1925, and then it started to decline. The whole analysis above indicates that there was a notable improvement in productivity during the first half of the 1920s. However, the increase in productivity halted, or rather decreased, in the second half of the decade, the development of the industry being rather labour-intensive.

The real wage per capita continued to rise until 1928, except for the slight decline in 1922. It was pushed up in 1921 at a higher rate than the increase in the real output per capita. It can be assumed that Higgins' generous Award contributed to this boost. Between 1922 and 1925, the real wage per capita continued to increase, although its rate of increase lagged behind that of the real output and raw material used per capita. In 1926 and 1927, however, the real wage per capita continued to increase, while the real output per capita reverted into the descending trend. It was only after 1928 that it started to decline, rather rapidly and considerably. It is indicated that after the increase in productivity halted in the mid 1920s, the real wage was bearing on the industry and, because of this, the impact of the Great Depression on wages was all the more severe.

Finally, Table 2.4 below shows the changes in the values of imports of metal products to Australia in both current and constant prices.
Table 2.4 (I) Nominal Value of Imports of Metal Products (x1000 pounds) and (II) Real Value of Imports of Metal Products (1920=100)*, 1919-1930

<table>
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</tr>
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<td>29-30</td>
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<td>97.1</td>
</tr>
</tbody>
</table>

Source: Official Year Book of the Commonwealth of Australia.

Note: Figures are taken from the category, 'Metals, Metal Manufactures and Machinery'.


The Table indicates that after the First World War the importation of metal products increased rapidly, putting too heavy a pressure on the industry to realise import substitution. As will be shown in Chapter Five, the value of imports was considerably higher in the 1920s than in the following decade in both nominal and real terms.